

What is claimed is:

- 1           1.     A storage device comprising:  
2                     a probe having plural tips; and  
3                     a storage medium having a surface,  
4                     wherein at least a first tip of the probe is adapted to form a dent in the storage  
5 medium,  
6                     wherein at least a second tip is adapted to electrically contact the surface of the  
7 storage medium in response to the first tip being engaged in the dent, and  
8                     wherein the second tip is electrically isolated from the storage medium in  
9 response to the first tip being engaged on the surface of the storage medium and not being  
10 engaged in the dent.
- 1           2.     The storage device of claim 1, wherein the second tip has a shorter length than  
2 the first tip.
- 1           3.     The storage device of claim 2, wherein the second tip is electrically  
2 conductive, and wherein at least a portion of the first tip is electrically insulating.
- 1           4.     The storage device of claim 1, further comprising a second probe having  
2 plural tips,  
3                     wherein at least a first tip of the second probe is adapted to form a second dent  
4 in the storage medium,  
5                     wherein at least a second tip of the second probe is adapted to electrically  
6 contact the storage medium in response to the first tip of the second probe being engaged in  
7 the second dent, and  
8                     wherein the second tip of the second probe is electrically isolated from the  
9 storage medium in response to the first tip of the second probe engaged on the surface of the  
10 storage medium and not being engaged in the second dent.

1           5.     The storage device of claim 4, wherein the probes are adapted to form the  
2     dents in one or more write operations.

1           6.     The storage device of claim 5, further comprising circuitry to detect data states  
2     during one or more read operations based on whether the second tips of the respective probes  
3     are electrically contacted to or electrically isolated from the surface of the storage medium.

1           7.     The storage device of claim 1, wherein the storage medium comprises an  
2     electrically conductive layer adjacent the surface, the dent being formed in the electrically  
3     conductive layer

1           8.     The storage device of claim 7, further comprising an electrical conductor,  
2                 the second tip to electrically communicate with the electrical conductor  
3     through the electrically conductive layer in response to the second tip being electrically  
4     contacted to the surface of the storage medium.

1           9.     The storage device of claim 1, wherein the first tip is heatable to a temperature  
2     to melt a portion of the storage medium to form the dent.

1           10.    The storage device of claim 9, wherein the first tip forms the dent during a  
2     write operation.

1           11.    The storage device of claim 10, wherein the storage medium contains storage  
2     cells, the storage device further comprising circuitry to detect for presence of the dent in a  
3     first one of the storage cells to determine a state of data stored in the first storage cell.

1           12.    The storage device of claim 11, wherein the probe and the storage medium are  
2     movable with respect to each other to enable the probe to write to and read from the storage  
3     cells.

12.

1           13.    A system comprising:  
2                   a processor; and  
3                   a storage device comprising:  
4                       a storage medium; and  
5                       a probe having a first tip adapted to form dents in the storage medium,  
6   and a second tip adapted to detect for dents in the storage medium,  
7                   wherein the first and second tips have different lengths.

1           14.    The system of claim 13, wherein the first tip is adapted to form the dents  
2   during a write operation, and wherein the second tip is adapted to detect for presence of the  
3   dents during a read operation.

1           15.    The system of claim 14, wherein the first tip has at least a portion formed of  
2   an insulating material, the second tip is formed of an electrically conductive material, and the  
3   storage medium has a layer formed of an electrically conductive material,  
4                   wherein the second tip is adapted to electrically contact the layer in response to  
5   the first tip being engaged in a dent.

1           16.    The system of claim 14, wherein the storage device further comprises circuitry  
2   to detect for at least one of a current or voltage in response to the second tip being in  
3   electrical contact with the layer.

1           17.    A method of storing data, comprising:  
2                   during a write operation, forming a dent in a storage medium with a probe  
3   having at least a first tip and a second tip;  
4                   during a read operation, indicating a first data state in response to detecting  
5   that the second tip is electrically contacted to a surface of the storage medium due to the first  
6   tip being engaged in the dent; and  
7                   during the read operation, indicating a second data state in response to  
8   detecting that the second tip is spaced apart from the surface of the storage medium due to the  
9   first tip not being engaged in the dent.

1           18.     The method of claim 17, further comprising heating the first tip to a  
2 temperature to melt a portion of the storage medium to form the dent during the write  
3 operation.

1           19.     The method of claim 17, further comprising detecting at least one of a voltage  
2 and current based on whether or not the second tip is electrically contacted to the surface of  
3 the storage medium.

1           20.     The method of claim 19, wherein the storage medium has a layer that is  
2 electrically conductive, the method further comprising establishing electrical communication  
3 between the second tip and the layer in response to the second tip being electrically contacted  
4 to the surface of the storage medium.

1           21.     The method of claim 17, wherein the storage medium has plural storage cells,  
2 wherein forming the dent comprises forming the dent in a first one of the storage cells, the  
3 dent in the first storage cell representing a first data state, the method further comprising:  
4                 during the write operations, not forming a dent in a second one of the storage  
5 cells, wherein absence of the dent in the second storage cell represents a second data state.

1           22.     The method of claim 21, further comprising the first tip engaging the dent in  
2 the first storage cell in response to the probe being positioned at the first storage cell,  
3                 whether the second tip electrically contacts the surface of the storage medium  
4 in response to the first tip being engaged in the dent of the first storage cell.

1           23.     The method of claim 22, further comprising positioning the probe at the  
2 second storage cell,  
3                 wherein the first tip remains engaged on the surface of the storage medium  
4 with the probe at the second storage cell, and  
5                 wherein the second tip is spaced apart from the surface of the storage medium  
6 in response to the first tip remaining engaged on the surface of the storage medium.

1           24.    A storage device comprising:  
2                   a probe having plural tips;  
3                   a storage medium having a surface; and  
4                   an electrically conductive trace on the surface,  
5                   wherein at least a first one of the tips of the probe is adapted to form a dent in  
6 the storage medium,  
7                   wherein at least a second one of the tips is adapted to electrically contact the  
8 electrically conductive trace in response to the first tip being engaged in the dent, and  
9                   wherein the second tip is electrically isolated from the electrically conductive  
10 trace in response to the first tip being engaged on the surface of the storage medium and not  
11 being engaged in the dent.

1           25.    The storage device of claim 24, wherein the second tip has a shorter length  
2 than the first tip.

1           26.    The storage device of claim 24, wherein the storage medium comprises plural  
2 storage cells, the storage device further comprising additional electrically conductive traces  
3 for electrical engagement with the at least second tip of the probe,  
4                   wherein each electrically conductive trace is provided in a gap between  
5 corresponding storage cells.